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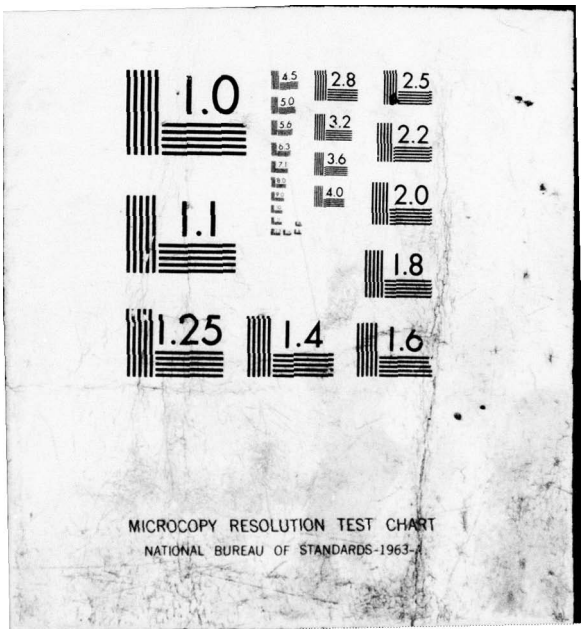
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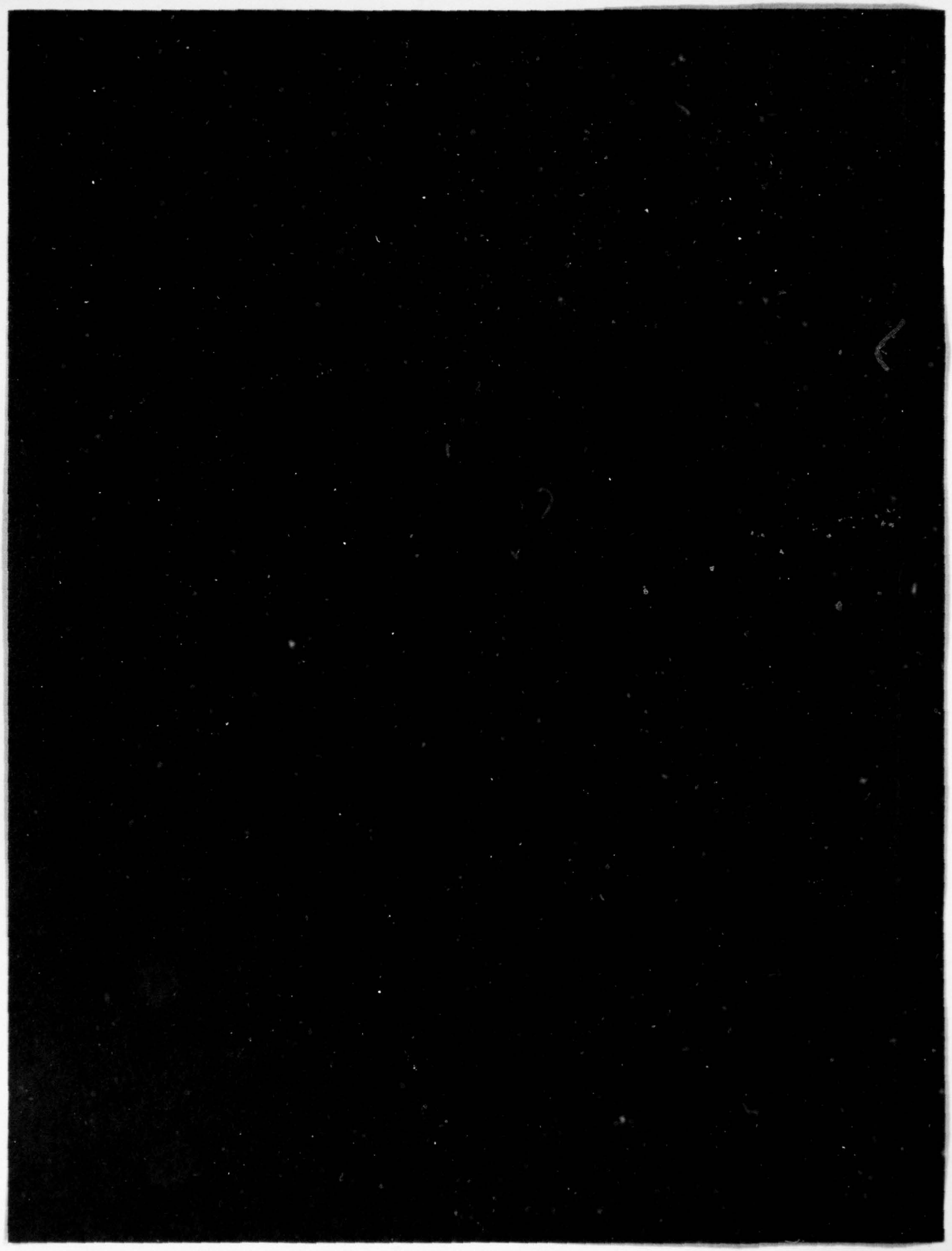

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Chemical Agent Munition Disposal System is a prototype facility for the large scale destruction of lethal chemical agents and munitions. This document describes the utility requirements.

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OPERATION

OF THE

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(CAMDS)

AT

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INCLOSURE NO. 18

UTILITIES REQUIREMENTS

PREFACE

The Tooele Army Depot South Area is presently equipped with water and electrical power. Due to the nature of the Chemical Agent Munition Disposal System (CAMDS), which is scheduled to commence operations in October of 1976, the limits of these utilities will be exceeded. Because of this, new electrical and water systems have been developed and are presented in this inclosure. The CAMDS steam requirements and boiler plant system are also discussed.

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LIST OF TABLES

1. WATER REQUIREMENTS FOR THE CAMDS

a. Water Requirements. Water requirements for each building block have been listed in Tables 1 and 2. The maximum average daily requirement is 58 gallons per minute (gpm). The peak requirement is 478 gpm.

b. Water Source. At the Tooele Army Depot South Area there are currently two water sources. The first source is located at the northeast corner of the South Area. This source has two wells and two pumps which supply potable water to two 500,000-gallon reservoirs located near the same area. These wells produce a total water flow rate of 573 gpm.

The second source of water is located at the CAMDS site. This source has one well and one pump which produces 100 gpm of non-potable water. There is also a 20,000-gallon storage tank at the site for storage purposes.

Because potable water is required at the CAMDS site, the first water source discussed will be used. The present South Area water lines from this source do not extend to the CAMDS site. A 9,000 ft, 6 inch, asbestos cement piping extension from the present South Area water piping system to the CAMDS site storage tank will be installed. This will provide 110 gpm potable water to fulfill CAMDS water requirements. (Max average flow 57.57 gpm from Table 1). Peak requirements which exceed the 110 gpm flow will be met by supplies in the 20,000-gallon storage tank. Since the CAMDS site is at a lower elevation than the reservoir, the water will gravity feed. Although this water is potable, acid pretreatment units and water softeners will be utilized to upgrade water to critical systems.

2. STEAM REQUIREMENTS FOR THE CAMDS

a. CAMDS Steam Requirements. The CAMDS steam load requirements are comprised of two types of loads. Process steam includes all steam required at 125 psig for the operation of the CAMDS facility. Heat steam includes all steam required at 15 psig for heat required to maintain an environment in which the workers and machines will function properly.

The mustard-filled projectiles with bursters were calculated as the system requiring the maximum steam supply. See Table 3. The high demand of the Metal Parts Furnace is based on an intermittent steam demand for quenching.

TABLE 1

DAILY WATER DEMAND - (gpm)

System	Agent	PSC	Dun	DFS	MPF	ETS	BIF	ADS	Boilers	CDS	DET	Safety	ECC	UPA	PDS	Total
	GB	4.8	2.0	-	3.33	-	.04	20.0	5	.17	2.0	0.2	-	-	-	37.54
Bulk Items	VX	4.8	2.0	-	3.33	-	.04	22.0	5	2.3	2.0	0.2	-	-	-	41.67
	H	4.8	2.0	-	16.35	-	-	-	5	1.0	2.0	0.2	-	-	-	34.35
	GB	4.8	6	15.07	-	1.5	-	20.0	5	-	2.0	0.2	-	-	-	54.57
M55's	VX	4.8	6	15.07	-	1.0	-	22.0	5	1.5	2.0	0.2	-	-	-	57.57
	GB	4.8	6	-	3.09	-	-	20.0	5	.5	2.0	0.2	-	-	-	41.59
Projectiles	VX	4.8	6	-	13.09	-	-	22.0	5	1.14	2.0	0.2	-	-	-	54.23
w/o Bursters	H	4.8	6	-	18.00	-	-	-	5	1.12	2.0	0.2	-	-	-	57.12
	GB	4.8	6	7.16	3.09	1.0	-	20.0	5	.5	2.0	0.2	-	-	-	49.75
Projectiles	VX	4.8	6	7.16	3.09	1.0	-	22.0	5	1.14	2.0	0.2	-	-	-	52.39
w/Bursters	H	4.8	6	6.31	18.00	1.0	-	-	5	1.12	2.0	0.2	-	-	-	44.43
M23 Land Mines	VX	4.8	4	8.78	-	1.5	-	22.0	5	1.5	2.0	0.2	-	-	-	41.28
4.2 Mortar	H	4.8	4	6.31	18.0	1.0	-	-	5	1.12	2.0	0.2	-	-	-	44.43

TABLE 2

PEAK WATER DEMANDS - (gpm)

SYSTEM	Agent	PSC	DUN	DFS	MPF	ETS	BIF	ADS	BOILERS	CDS	DET	SAFETY	ECC	UPA	PDS	TOTAL
Bulk Items	GB	33	6	-	82	-	8	200	20	30	2	20	-	-	-	401
	VX	33	6	-	82	-	8	200	20	30	2	20	-	-	-	401
	H	33	6	-	82	-	8	25	20	30	2	20	-	-	-	226
M55's	GB	33	12	49	-	30	-	200	20	-	2	20	-	-	-	366
	VX	33	12	49	-	-	-	200	20	30	2	20	-	-	-	366
Projectiles w/o Bursters	GB	33	12	-	82	-	-	200	20	30	2	20	-	-	-	399
	VX	33	12	-	82	-	-	200	20	30	2	20	-	-	-	399
	H	33	12	-	82	-	-	25	20	30	2	20	-	-	-	224
Projectiles w/Bursters	GB	33	12	49	82	30	-	200	20	30	2	20	-	-	-	478
	VX	33	12	49	82	-	-	200	20	30	2	20	-	-	-	448
	H	33	12	49	82	-		25	20	30	2	20	-	-	-	273
M23 Land Mines	VX	33	12	49	-	-	-	200	20	30	2	20	-	-	-	336
4.2 Mortar	H	33	12	49	82	-	-	25	20	30	2	20	-	-	-	273

TABLE 3

STEAM REQUIREMENTS FOR CAMDS*

SYSTEM/FACILITY	REQUIREMENTS	
	Peak	Summer
Unpack Area (heat)	279	-
Explosive Containment Cubicle (heat)	495	-
Deactivation Furnace System (heat)	530	-
Metal Parts Furnace (process)	4560	4560
Metal Parts Furnace (heat)	1100	-
Dunnage Incinerator (heat)	40	-
Agent Destruct System (process)	13300	10580
Agent Destruct System (heat)	1575	-
Utilities Building (heat)	110	-
Explosive Treatment System (heat)	83	-
Central Decon System (process)	500	500
Projectile Disassembly Facility (heat)	264	-
TOTAL	22836	15640

*Mustard Projectiles with bursters

Steam requirements for CAMDS will be:

Steam Demand	22836 #/hr	
25% Contingency	5709 #/hr	
SUB TOTAL	28545 #/hr	
25% Pickup Factor	7136 #/hr	
10% Piping Loss	2855 #/hr	
TOTAL	38536 #/hr	= 1117 boiler hp

Summer load demand for the site is shown in Table 3. The total summer site requirements are as follows:

Steam Demand	15640 #/hr	
25% Pickup	3910 #/hr	
5% Piping Loss	782 #/hr	
	20332 #/hr	or 590 boiler hp

b. CAMDS Boiler Plant. The CAMDS steam system is a centralized boiler plant consisting of two 600 hp boilers. A centralized system implies that the boiler system be located in one central boiler house. The advantages of the centralized boiler system are:

(1) Versatility in response to large diversities in steam requirements.

(2) Centralized equipment to simplify maintenance.

(3) A common steam header between boilers provides a backup system.

(4) One condensate return system.

(5) Reduction of boiler operators required.

Advantages of the two boiler system are:

(1) Full 1200 hp capacity.

(2) Easy to maintain.

(3) Two boilers properly sized would allow one boiler to be down and still have one to carry steam loads. The boilers are equal in size and large enough to carry all process loads during boiler maintenance down time. If a boiler fails, one boiler will be able to provide enough steam to keep the operations going on a limited basis.

3. ELECTRICAL REQUIREMENTS FOR THE CAMDS

a. Introduction. Due to anticipated electrical requirements at the CAMDS site, the present South Area power supply system is not adequate. Anticipated peak total electrical requirement for the CAMDS site is estimated at 1735 KVA. Present power line to the site can only deliver an estimated 720 KVA. Also, the present CAMDS electrical system has no provision for a required 480 V emergency electrical system to support functions of the system which require 480 V power during a power outage. For these reasons, a method of supplying adequate power to the site has been developed. A 480 V emergency electrical system has also been developed.

b. Existing Power Supply System. Electricity is supplied to the South Area from a 2500 KVA, 12,470 volt Utah Power & Light (UP & L) substation located approximately 2.5 miles from the northern boundary fence of the South Area. This substation also furnishes approximately 150 KVA to the town of Ophir and some ranches and mines in the area. At the South Area boundary, a metering service is provided by UP & L to determine the power usage of the South Area.

Government-owned South Area power lines connect with UP & L lines at the boundary and are six strands of #6 solid copper wire. These are connected into two wye systems. Each system is three strands of #6 wire and a smaller size neutral wire. One system supplies power to the site by an indirect route covering seven miles. This system also supplies approximately 100 KVA for other South Area requirements and the CAMDS perimeter monitor system along the route. The other wye system supplies approximately 100 KVA to the other portions of the South Area. Due to the size of wire used in the South Area power systems and the distance to the site, a calculated maximum of 720 KVA can be furnished to the site without excessive voltage drop requiring voltage regulators.

c. CAMDS Electrical Requirements. Table 4 provides a listing of CAMDS electrical requirements. Demilitarization of burstered GB or VX filled projectiles will require the maximum amount of electrical power and the figures shown in Table 4 reflect this configuration. The loads listed in the total connected column are loads which could be turned on during demilitarization of GB or VX filled projectiles and are not actually all connected loads. The loads listed under continuous running are loads which will be on all the time; i.e., minimum amount of power that will be used at the site. The peak load column lists the maximum load for each building block for the above process. The total for the peak load column is the maximum load under normal conditions. Since it is very unlikely that all building blocks will be using peak load at one time, a diversity factor was applied to each building block to determine the Average GB, VX load. The data for Table 4 was obtained from final concept designs and design drawings as well as measurements taken during actual operation. For continuously running motors, a load factor of .75 was used. Where no other load factors were available, a power factor of .9 was used.

TABLE 4

CAMDS ELECTRICAL POWER REQUIREMENTS (KVA)

	TOTAL LOAD CONNECTED	MINIMUM LOAD	PEAK LOAD	AVERAGE LOAD
Unpack Area	10.9	0.0	2.2	2.0
Explosive Containment Cubicle	2.0	0.0	1.0	1.0
Deactivation Furnace System	391.0	40.0	333.0	250.0
Metal Parts Furnace System	413.0	186.0	295.0	255.0
Dunnage Incinerator	18.0	0.0	11.0	8.0
Utilities	225.0	70.0	140.0	105.0
ECC Hydraulic System	9.0	0.0	8.3	6.3
Control Center	25.2	0.0	25.2	21.2
Personnel Support Complex	119.2	0.0	119.0	90.0
Agent Destruct System	647.0	125.0	460.0	345.0
Explosive Treatment System	12.8	0.0	9.3	9.3
Projectile Demil Machine	5.0	0.0	6.0	6.0
Projectile Pull & Drain	24.5	0.0	15.0	15.0
Central Decon System	8.5	3.5	4.5	4.5
Projectile Disassembly Facility	3.0	0.0	3.0	2.0
Material Handling Equipment	10.6	6.0	8.0	7.0
Filter System	122.0	100.0	122.0	92.0
Piping	20.0	0.0	20.0	15.0
Electrical	59.0	0.0	59.0	59.0
Perimeter Monitoring	96.0	8.0	48.0	42.0
Closed Circuit Television	2.0	1.0	2.0	2.0
Communication	1.2	0.0	1.2	1.0
Detectors	10.0	10.0	10.0	10.0
Site Control System	15.0	0.0	8.6	8.6
Boilers	135.0	30.0	60.0	50.0
Other	50.0	0.0	23.5	13.5
	2299.7	549.5	1734.8	1361.8

Peak electrical demands may also be reached during M55 rocket systemization. During this period, while not required for rocket systemization, it will also be necessary to test the Metal Parts Furnace, the Bulk Items Facility and the Projectile Pull and Drain Machine. There may be occasions during peak power demands where it may be necessary to augment the normal power with either the 208 volt or 480 volt Emergency System. These systems will not parallel the normal power, but will be completly separate from other sources of power. This augmentation will ease the demand on the limited power available from the substation, as well as reduce peak demand costs.

d. CAMDS Power Supply System. To meet the CAMDS electrical requirements, a new power supply line to the CAMDS site will be installed. This line will supply power to the site directly from the UP & L supply lines at the north boundary. Length of the line will be approximately five miles.

Available wire will be used as well as available insulators and cross-arm braces. Voltage regulators will not be required. The posibility of power outages on this line will be reduced since no other South Area electrical requirements will be on this line. Separate metering will be installed on the new power line which will record total power required as well as peak demand.

e. Emergency Electrical System. In the event of a power outage during CAMDS operations, a back-up or emergency power supply system is required. This system will only supply power to those portions of the system which require systematic shutdowns such as chemical processes, cooling down of furnaces and the boiler system. Table 5 provides data on those systems requiring emergency electrical power.

TABLE 5

CAMDS EMERGENCY POWER REQUIREMENTS (KVA)

	208 VOLT	480 VOLT
Deactivation Furnace System		90.0
Metal Parts Furnace System		100.0
Utilities		158.0
Control Center	12.6	
Agent Destruction System		258.0
Bulk Item Facility	3.0	
Filter System	100.0	
Electrical	36.5	
Closed Circuit Television	2.0	
Communications	1.2	
Site Control System	8.6	
	163.9 KVA	606.0 KVA

A 208 V 235 KW emergency power system is installed at the site at the present time. This system is adequate to handle present and anticipated emergency electrical requirements to all area using 208 V power. This system uses two diesel-powered generators, one on line, one for backup, and is capable of supplying emergency power within 10 seconds after a power outage of the main power supply. This system senses any power outage and automatically starts generator No. 1. If generator No. 1 fails to start, generator No. 2 will automatically be started.

After the generator is running, the automatic transfer switch connects the generator to the emergency power bus. Ten seconds after commercial power is restored, the automatic transfer switch restores commercial power to the emergency bus and stops the generator.

The Tooele Army Depot (TEAD) retrograde section has an extensive amount of electric generating and power supply equipment which will be used to construct a 480 V emergency electrical sypply system. The following items are available to CAMDS on a free issue basis, and are not a part of the Corp of Engineers' electrical contingency stockpile: A new condition 625 KVA, 4160 V diesel driven generator with necessary switches and control panel. Cooling radiators for above generator. The original cooling radiator for the generator is not available. These radiators will require some modifications and piping and will require electric-driven fans. These modifications will be minor and present no problems. Design of the diesel engine on the generator requires the use of an electric-driven fan on the original cooling radiators. Use of the cooling radiators available will require some additional engineering and procurement and assembly of suitable electric-driven fans.

The 480 V emergency system will require one each 750 KVA 480 V transformer. This size transformer is available at TEAD, but is part of the Corp of Engineers' electrical contingency stockpile and is available only on a loan basis. In view of the cost of this size transformer ($15,000) and the improbability of its being recalled, this transformer was obtained. With the above equipment, a 480 V emergency electrical supply sytem can be constructed which will be adequate to meet CAMDS requirements.